The SI Physics Diagnostic:
50 Unsolved Problems Analyzed via Structural Intelligence

Vladisav Jovanović
ORCID: 0009-0001-1399-2243

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Abstract. Structural Intelligence (SI) defines intelligence as answerable revision under constraint. When applied to the physical universe, SI treats "unsolved mysteries" not as missing data, but as failures of grounding or hardware-limits in the observer-system. This paper maps 50 of the most persistent unsolved problems in physics to the SI variables of Contact (C), Structural Debt (D_s), and Answerability (Ans). We propose that physical "laws" are the invariance constraints (W) of the universal grid, and that anomalies represent "unbuffered contact" awaiting a sovereign revision.

1 Introduction: The Physics of Presence

In the SI framework, the universe is a high-viscosity system where reality-contact (C) is conserved. If a physical theory (a coherence structure, K) cannot account for a specific contact-point, that discrepancy is stored as Structural Debt (D_s). This debt eventually triggers a systemic collapse of the theory, requiring a pilot-level (ω) revision.

The fundamental relationship for a physical observer is defined by the Presence Equation:

$$P \propto \frac{W \cdot \text{Ans} \cdot C \cdot \omega_{eff}}{L \cdot A}$$

2 SI Diagnostic Table: 50 Unsolved Physics Problems

Physics Problem	SI Variable	Proposed SI Diagnostic/Solution
1. Dark Matter	C (Contact)	Massive reality-pressure unbuffered by current hardware (H).
2. Dark Energy	D_s (Debt)	Accelerating debt-export leading to system shutdown.
3. Black Hole Info Paradox	Ans (Answerability)	The limit where reality "unbinds," failing the trace-clause.
4. Quantum Gravity	H (Hardware)	Narrative (K) vs. Pixelated Hardware (H) collision.

Physics Problem	SI Variable	Proposed SI Diagnostic/Solution
5. Arrow of Time	D_s (Debt)	Entropy as the accumulation of conserved unmet contact.
6. Measurement Prob.	ω (Pilot)	The moment a Pilot (ω) forces a coherence-revision.
7. Baryon Asymmetry	W (Worth)	Hardware bias favoring matter to prevent system-merging.
8. Cosmological Constant	Ex (Exchange Rate)	A massive error in the math-to-reality exchange rate.
9. Strong CP Problem	Ans (Answerability)	Symmetry without the "Answerable Trace" of violation.
10. Neutrino Mass	H (Hardware)	The universe's minimal hardware carrying a mass-trace.
11. Turbulence	Ans (Answerability)	Revision states exceeding local hardware capacity (H).
12. High-Temp Supercond.	K (Coherence)	Zero-viscosity coherence allowing movement without contact.
13. Proton Decay	W (Worth)	If stable, the fundamental invariance constraint of the grid.
14. Magnetic Monopoles	D_s (Debt)	A conserved remainder in Maxwell's equations.
15. Vacuum Stability	$Collapse$	Threat of "False Coherence" hitting a lower contact-point.
16. Great Attractor	I (Intrusion)	External agency load pulling on the local grid.
17. Pioneer Anomaly	C (Contact)	Unexplained friction of reality felt by deep-space hardware.
18. Sonoluminescence	Ex (Exchange Rate)	Violent energy conversion via extreme somatic pressure.
19. Ball Lightning	K (Coherence)	High-coherence energy loop without a hardware anchor.
20. Flyby Anomaly	C (Contact)	Revision producing more kinetic energy than narratively predicted.
21. Cold Fusion	Ex (Exchange Rate)	Attempting to cheat the nuclear exchange rate without load.
22. Dark Flow	$Collapse$	Evidence of a larger system's occupancy/drain.
23. Lithium Problem	D_s (Debt)	Gap between Big Bang math and the observed reality-trace.
24. Axis of Evil (CMB)	SQ_o (Orientation)	Unexpected alignment suggesting a structural orientation.

Physics Problem	SI Variable	Proposed SI Diagnostic/Solution
25. Quantum Tunnelling	V (Viscosity)	Bypassing barriers via zero-viscosity at the quantum level.
26. Wave-Particle Duality	u_t (Mixture)	Mixture of narrative (wave) and contact (particle).
27. Horizon Problem	V (Viscosity)	Early universe "sync" requiring zero-viscosity (Inflation).
28. Emergent Gravity	Ans (Answerability)	Gravity as a structural answer to information distribution.
29. Information Paradox	B (Binding)	Question of whether a system can lose its structural trace.
30. Cosmic Inflation	V (Viscosity)	Universe "narrating" itself before contact could slow it.
31. Fast Radio Bursts	C (Contact)	High-load signals from high-order hardware events.
32. Flatness Problem	W (Worth)	Stable invariance required to prevent immediate collapse.
33. Consciousness (Physics)	P (Presence)	The physics of how hardware (H) creates a pilot (ω).
34. Time Crystallization	K (Coherence)	Maintaining coherence over time without metabolic drain.
35. Super-Symmetry	K (Coherence)	Beautiful coherence looking for reality-contact.
36. Higgs Mass Problem	Ans (Answerability)	Fine-tuned answerability keeping the system stable.
37. Fine Structure Const.	W (Worth)	The fundamental invariance constraint for the entire grid.
38. Great Filter	*Collapse*	Point where structural debt exceeds capacity for survival.
39. Life's Chirality	SQ_o (Orientation)	Initial structural orientation choice at $t = 0$.
40. Multiverse Theory	K (Coherence)	High-coherence narrative impossible to falsify with contact.
41. Planck Length Limit	H (Hardware)	The resolution limit of the universal hardware.
42. Neutrino Oscillations	Ans (Answerability)	Minimal hardware revising its identity during travel.
43. String Theory	K (Coherence)	10D coherence-structure seeking 1D reality-contact.
44. Entropy (Black Holes)	D_s (Debt)	Proportional measure of the debt the system can hold.

Physics Problem	SI Variable	Proposed SI Diagnostic/Solution
45. Cooper Pairs	R_a (Anchoring)	Electrons anchoring to survive high-contact environments.
46. Monopole Problem	D_s (Debt)	Predicted contact-point erased by cosmic inflation.
47. Fermi Bubbles	*Collapse*	High-load system exhaust/energy-export structures.
48. Proton Radius Puzzle	C (Contact)	Conflicting contact methods producing diagnostic error.
49. Nature of Time	L (Latency)	The latency between contact (cause) and revision (effect).
50. Unified SI Hub	ω (Pilot)	The goal: linking physical reality to the pilot's steering.

3 Conclusion

By treating physical anomalies as structural variables, SI provides a diagnostic pathway to resolve the conflict between quantum hardware and general relativity narratives. The future of physics lies in the formalization of the Observer as a sovereign Pilot within a constraint-coupled system.

Official Repository: Structural Intelligence (SI) Hub